# Frankly Speaking

## On The Alert

"*Immediate Improvement of Defense Production Transport*" eliminating all "Business-as-usual" in traffic engineering was adopted unanimously by the Institute of Traffic Engineers October 7, 1941, two months before Pearl Harbor. That farsighted recognition by traffic engineers of the prodigious part that traffic meant to the war effort was ample proof that the profession was "ON THE ALERT."

All traffic engineers immediately converted their efforts to all-out war requirements. Representative of the contributions of traffic engineers to victory and the changes that have taken place in traffic are the following summarized items:

CONSERVATION: Curtailment of production of tires and automobiles necessitated drastic conservation programs to control speeds, to eliminate unessential driving and to organize swap-ride groups. Traffic engineers used every means to conserve the useful life of automobiles and tires until the day when more plentiful rubber and limited automobile production arrives.

STAGGERED HOURS: Astounding concentrations of war workers created the need for staggered hours as public transportation agencies became overtaxed. Most war plants now have their hours staggered away from usual peak periods.

NEW DUTIES: Increased population, housing shortages, development of new war plants away from workers' homes created an increase in vehicle miles of travel in the war production centers. Changed travel habits required retiming traffic signals, resigning streets, creating new arterial thoroughfares, preparing war transportation routes and establishing one-way streets. This had to be done with a minimum of manpower and critical materials.

Safety had to be maintained. Injuring and killing war workers is the "seventh column" in the war effort. Safety programs multiplied as metropolitan areas become crowded with rural persons unaware of the deadliness of concentrated traffic. Increased emphasis on safety had to be maintained.

VICTORY WILL BE NO ACCIDENT(S).

While the members of the profession at home were being taxed with challenging problems, many were called to the armed forces and to practically every branch of the federal government to assist in the transportation crisis created by our all-out Army.

Not all past problems have been completely solved, and new problems are constantly being created. Gasoline rationing is but one more hurdle which finds the traffic engineer ready with his sleeves rolled up.

October 7, not December 7, found the traffic engineer prepared for all emergencies. The nation can depend on these men to continue being "ON THE ALERT."

D. Grant Mickle

President I.T.E.

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# Thirteenth Annual Meeting

## INSTITUTE OF TRAFFIC ENGINEERS

### October 25-27, 1942

THE keynote of The Business Meeting of I.T.E. members on Sunday, October 25th is foreshadowed in President Mickle's editorial in TRAFFIC ENGINEERING October 1942—*"On The Alert."*

Despite fast changing conditions drastically affecting our professional duties, Traffic Engineers can report *"All's Well."*

This feeling of accomplishment in spite of mounting obstacles runs through the entire Thirteenth Annual Meeting.

Monday morning, October 26th civilian and military wartime traffic engineering problems—*Automobile Movement and Parking at War Plants, The Selection and Marking of Military Routes, The Policing and Control of Military, Transport and Evacuation Routes,* etc. will be thoroughly investigated and definite standards will be established.

Monday afternoon, October 26th keen observers will dissect *What* Traffic Engineers are doing and *How* they are getting results: *Conserving Mass Transportation for War Plants, Blackout Practices, Substitutes and Priorities,* and *The Aid Traffic Engineers are giving the O.D.T. Program*—all these subjects will receive searching analysis and evaluation. Even more important, however, from the long range viewpoint will be the minutes spent when those attending will set their sights on the *Widening Horizon for Traffic Engineers Created by the War*—an horizon which should give heart to those enmeshed in a minute of routine and instill in others inclined to paint too broad imaginary strokes, a leveling influence within the realms of local, state and national fiscal realities.

Monday evening, October 26th at the I.T.E. Annual Dinner, Mr. Guy A. Richardson, Director, Local Transport Division, Office of Defense Transportation, Washington, D. C. will highlight the program with a "question and answer" address on *War Transportation Problems of the Traffic Engineer* in both of which Mr. Richardson excels.

Tuesday morning, October 27th—*Traffic Accidents and The War Program, Conservation of Manpower, Tires and Vehicles, Traffic Facilitation in Critical Areas, The Effect of War Conditions on Traffic Volumes* and the Program of the Highway Traffic Advisory Committee to the War Department will climax one of the most momentous Annual Meetings in the history of the Institute of Traffic Engineers.

Its motto and ours for the duration might well be—

*Ad Astera per Aspera!*

# WARTIME PERSONNEL PROBLEMS OF TRAFFIC ENGINEERING

IN a war such as this, depending largely upon mechanized equipment and speedy transportation of men and materiel, technically-trained men, particularly engineers, are needed in exceedingly large numbers. As a result the demands of our military and naval forces have taken a heavy toll among the ranks of traffic engineers.

Because of their training and experience in the handling of traffic and transportation problems, traffic engineers have been called to the service as commissioned officers in a very high ratio to the total number of qualified and available men. In addition, many traffic engineers are serving, in civilian capacities, with the army and related governmental agencies on either a full or part-time basis. Thus, when the civilian transport problem of the nation is at its most critical point the number of qualified traffic engineers has been depleted to a level far below that of normal times.

How, then, can the remaining engineers, already overburdened with new and increasingly difficult problems in their own localities, expand their activities and scope of interest so that communities without the necessary technical personnel and facing critical transportation problems may receive the trained guidance that is so sorely needed. The answer is not a simple one.

In the first place, the younger men who might be expected, through intensive specialized training and "upgrading" to fit into more responsible positions are in the age group most needed for combat duty. In the second place, even if these men were to remain in civilian life it is unlikely that adequate training facilities could be made available for any large number because of the shortage of trained instructors.

Thus it seems almost inevitable that major reliance must be placed upon men in each locality whose training and experience is such as to provide a background for the intensive study of each local transportation problem so that at least approximate solutions may be derived. The sources from which such men may be obtained include transportation companies, both property and passenger, traffic departments of industrial plants, personnel managers and others in similar occupations whose experience has to do with the movement either of commodities or passengers. These men,

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naturally, will be volunteers devoting a part of their time, without charge, to the study of these problems. They will have to learn their jobs as they go along, in many instances, profiting by their own mistakes. The exigencies of the situation, however, are such that it is impracticable to search too long for the ideal solution; it is preferable to reach a solution of some sort which appears reasonable and determine its appropriateness by practical application. If it works reasonably well, let it be assumed that it was a correct answer; if it fails, then something else must be tried. By this process of trial and error, the job can be done. The traffic engineers of the country, by advice and consultation with such men can help greatly in eliminating mistakes, or at least in reducing their number.

In the event that problems arise involving matters which local officials feel cannot be solved without outside assistance the Institute of Traffic Engineers will be glad to suggest the names of competent traffic or transportation engineers who may be called upon for advice and consultation. In matters such as this, it would be impossible for the Institute, or for any of its members, to attempt to offer such advice on the basis of written communications; only by first-hand and personal observation and knowledge of all the facts is it possible to resolve the vast majority of problems which will arise in the transportation field within the next year or two.

## A REVIEW AND REAPPRAISAL OF WAR TRANSPORT PROBLEMS

INTRODUCTION: American entry into war has presented traffic engineers with their greatest challenge and finest opportunity to be of important service to their country. On land, on sea, and in the air this war is basically a struggle to keep transportation lanes open and functioning efficiently so that our combatants may bring their might to bear upon the enemy at the points where conflict develops. The attention of the public is naturally drawn to the spectacular achievements of combat forces, with the result that the less dramatic, but vitally important work of military motor transport vehicles, for example, and civilian and industrial transport of all sorts in non-combatant areas, is often forgotten. But if war workers do not get to their benches, materials and finished products will not reach their destination. Supplies and ammunition cannot be furnished to combat areas unless transportation facilities of many types function ceaselessly and efficiently. It is no exaggeration to say that the production front is so dependent on transportation that if it fails or is seriously impaired, an industrial paralysis will set in sufficient to lose the war.

Now that production is already greater than ever before and is increasing steadily, our internal transportation system must meet unprecedented demands. These demands must be met at a time when there is no production of new automobiles for civilian use, a rubber shortage which prohibits the manufacture of civilian tires, fuel rationing to conserve heavy transportation facilities, vehicles, and tires, and a decrease in road construction and maintenance due to shortages of materials, funds, and manpower. Most of these demands must be met by privately-owned motor vehicles, for the United States, more than any other nation in the world, is "A Nation on Wheels."

In the years preceding the war, the infant profession of traffic engineering demonstrated its ability to cope successfully with problems of traffic congestion and accident hazards and provided remedial and preventive measures. To the peacetime problems has been added the increased demands of a war and the vital need for conservation of vehicles needed to perform a maximum of essential work. It is the responsibility and privilege of the traffic engineers to attack and solve these problems at a time when the nation's very existence depends on the continued functioning of our transportation resources.

## The Past Development of Road Transportation

For over 30 years our American economy has become increasingly dependent upon *motor* vehicle road transportation. At the turn of this year, we possessed 29,000,000 passenger autos, 4,900,000 trucks and nearly 146,000 buses of all types, plus nearly 29,000 surface trolley cars.

*Autos*: Nearly 43.5 per cent of our population living in rural areas is almost entirely dependent on private automobiles for transportation. Over 54,000 communities are without railroad service and some 2,300 towns do not have any means of mass transportation whatever. Large numbers of the population have moved from dense urban developments in metropolitan areas to homes in the suburbs or rural areas, meanwhile continuing to gain their livelihood in the city. These, too, have built their social and economic life around the automobile; for the sparseness of such commuter populations does not economically justify common carrier systems, except in some instances where smaller motor buses have found it possible to operate profitably.

Each year we traveled an estimated 500 billion passenger miles by private auto, plus 73 billion passenger miles by all forms of common carrier. It is significant that over half (57%) of the auto passenger mileage was utilized for essential, necessary activities exclusive of social and recreational travel. One of the most striking characteristics of automobile usage is that only a very small percentage of passenger autos has been used *exclusively* for essential activity and likewise only a very small percentage has been used exclusively for recreational and social travel.

The average length of a motor vehicle trip has been about 15 miles. This demonstrates the preponderance of automobile use for local transportation purposes. The high American standard of living has permitted us to develop personalized transportation, the larger portion of which is local transportation—a service which is not suited to the railroad and which, because of lack of density of travel, cannot be economically performed by buses or street cars in the rural and suburban sections of the country, but which, with an additional inconvenience involved, could be carried out reasonably well in denser urban areas provided such bus or street car facilities were made available.

*Trucks*: The 4.9 millions of trucks which we use are engaged not only in farm to market and strictly local haulage (the average trip length being 17.4 miles), but also between communities and from rail heads to the communities referred to above. It has been estimated that these trucks are now covering over 160 billions of ton miles per year—nearly half as much as the rail ton-mileage for 1940 and perhaps about a quarter of the present railroad ton-mileage. Large numbers of small plants are entirely dependent on motor truck shipments for their continued operation. For example, in Michigan it was found that 13½ per cent of the war production plants were solely dependent on the motor truck.

*Buses and Surface Cars*: As previously indicated, bus and street car carriers account for approximately 50 billions of passenger miles or about 10 per cent of the automobile passenger mileage. In urban areas alone, because of the shorter trip length involved, the local transit carriers (using the public way, i.e.: 28,000 street cars; 37,600 buses; 3,100 trolley buses) handled over 12 billion riders in 1941. These carriers are nearly the only means of transportation in dense urban areas as is the automobile the sole means in rural and suburban territory. Thus, in urban areas as a whole, 3 out of 4 persons are without automobiles and are wholly dependent on local common carriers. It is significant that the dependence of the individual upon the automobile for local transport increases as the population of the city decreases. For this reason, mass carriers in small cities have not developed as intensively as has been the case in larger metropolitan areas.

## Present Problems of Road Transportation

At present road transportation is confronted with serious problems, the solution of which is essential to its continued efficiency of performance. It is clear that road traffic is a link in the entire chain of transportation. If such traffic fails, the chain will snap, thereby jeopardizing our production effort and the prosecution of the war.

*Rubber*: The principal factor limiting wartime road movement is the rubber shortage. Our normal sources of rubber have been reduced by at least 90 per cent. Moreover, while tires normally consumed nearly three-fourths of our annual rubber supply, new demands imposed by military needs must be met. Normally we used about 650,000 tons of rubber per year, using 220,000 tons for auto tires and about 240,000 tons for truck and bus tires, or a total of 460,000 tons per year for tires. At the turn of the year we had about 578,000 tons of crude rubber on hand, according to the Baruch Committee report. We could expect only about 53,000 tons more from other sources until 1944, making a total of 631,000 tons available till that date. But the expected military demand alone is 842,000 tons! Before we start we are confronted by a shortage of 211,000 tons by January 1, 1944. This shortage will have to be met before any synthetic stock can be made available for civilian tires. While the recent scrap drive yielded about 300,000 tons, the scrap on hand will require many months of operation of the entire reclaiming industry and, in the meantime, the newly accumulated scrap constitutes a hazard which must wait for the reclaiming agents. While 20 per cent increased capacity of reclaiming plants is recommended, it will take about a year to increase reclaiming capacity materially. Also the quality of rubber thus procured will be distinctly inferior.

It was indicated by the Baruch Committee that we must rely mostly on the new synthetic process and that if we are fortunate we may produce 425,000 tons of synthetic rubber by January 1, 1944.

Until the supply of such synthetic rubber becomes fully adequate, the only rubber available for tires will come from the reclaimed rubber, a small amount of crude, and certain substitutes which may be used for recapping.

Surveys made during the past summer at industrial plants indicate that the 130 million auto tires already in use have been worn so much that from 30 to 60 per cent will be completely worn out in six months or so unless they are recapped in the meantime. We have on hand a stock of perhaps seven million tires and our normal auto consumption of tires amounts to some 40-odd millions annually. Thus, as we normally replace tires at the rate

of about 30 per cent per year, to continue normal operations without recapping of tires would mean the cessation of automobile use at the rate of about 2½ per cent per month.

*Metals*: But the rubber shortage for tires is not the only factor which will limit road transportation in wartime. We are short of steel, copper, and other metals for replacing wornout vehicles. We have been scrapping about 480,000 or about 10 per cent of our trucks per year. We junked from about three to 15 per cent of our cars per year, depending upon how hard put we were economically. We normally required 342,000 tons of essential war material each year for truck maintenance alone. On the other hand, we have no more than 75,000 new trucks on hand and less than a quarter of a million new autos. No new equipment can be manufactured.

*Increased Demands*: Nevertheless at the present time the demands for transportation by road are mounting. Increased essential travel incurred by rising war production must of necessity be carried by vehicles which were scarcely more than sufficient in depression years. This demand is manifesting itself especially in urban areas and near the war production centers. Inter-city bus traffic is up nearly 40 per cent, city bus traffic has increased 14.7 per cent and city-suburban traffic has mounted 20.6 per cent for the second quarter of this year as compared with the same period last year. In some areas where new industrial plants have been placed in operation, traffic has doubled on mass carriers. Rail movement reflecting the demand for road movement is up 30 per cent over last year.

On the other hand, according to surveys by the Public Roads Administration, rural highway traffic in July was down 41 per cent in gas rationed areas and 28 per cent in non-rationed areas as compared with the same month a year ago. Toll facilities show a decline of 32 per cent. In this connection, attention is called to the relative percentage (43%) of auto mileage use which may be classed as non-essential or social and recreational. Further substantial declines cannot be expected in rural areas.

*Plant Location*: Because we have located large numbers of our war production plants, employing thousands of workers, away from the dense population centers, it is not unusual to find the average trip for employees to or from work to be as much as eight or ten miles. Such locations, when selected, were undoubtedly excellent but the site chosen pre-supposed unrestricted auto use. To bring housing to such plants involves an undertaking which would employ prohibitive amounts of precious metals and manpower.

*Fuel Rationing*: Rationing of motor fuel has already been adopted on a nationwide basis. Although there is no shortage of petroleum or of facilities for making gasoline, motor oils, and fuel for heating purposes, this step was taken for several obvious reasons. Particularly in east coast states, most motor vehicle fuel was transported from the wells to places of consumption by seagoing tankers. Enemy destruction of such tankers and the need for them for essential war hauling, including trips to distant parts of the globe, indicates that they should not be exposed to enemy attack except when absolutely necessary to the prosecution of the war. The shortage of tankers has in turn placed a heavier burden on rail transport, which is already overburdened by strictly war production and military duties. Thus to relieve the burden on heavy transport facilities, gasoline and fuel oil rationing was found necessary. Although pipelines may be built to transport some of this fuel to various sections of the country, rationing will still be desirable as the

materials and manpower needed for their construction is also needed for military purposes, and in the last analysis all manpower and materials utilized to produce facilities and fuel which are not essential to the war effort is of no benefit to the prosecution of the war. But the principal reason for fuel rationing is to conserve tires. It is axiomatic that an automobile will not run without fuel! Of particular interest at this time is the likelihood that oil for heating purposes will be given priority over motor fuels during the cold months.

### Future Conservation of Road Transport

Looking ahead, the watchword of road transport must be *conservation*. We must save, save, save. We must eliminate unessential travel. We must maintain scrupulously and with the greatest economy, the vehicles we have, and above all the traffic which must move should be moved with the greatest efficiency of vehicle use. Conservation of rubber tires and metals is paramount.

*Reduction of Unessential Traffic*: It has been shown that 43 per cent of our automobile use has been for recreational and social purposes. Such use must be cut to the bone by effective nation-wide measures. The amount of unessential travel by public carrier is not known, but in this class of traffic, too, every step should be taken to eliminate unnecessary travel.

*Surface Transit Problems*: In urban areas where mass transportation exists it will be found that as the use of passenger autos is lessened because of conservation measures or through depletion of vehicles or tires, these public carriers will be called on increasingly to take over the burden of local transportation. Last year such carriers hauled some 12 billion passengers by means of surface lines only, including bus and trolley. This street transit load during the second quarter of 1942 was up and over 14 per cent and it is estimated now that by the end of this year the increase will amount to some 30 per cent and even exceed 50 per cent in some communities.

*Staggering of Loads*: Because practically no additional public transit vehicles can be made available, the load factor of such systems must be improved by means of staggering of working hours, shopping hours, and in other ways designed to level off the peaks of demand. Indeed, in normal times, the peak hour demands for such local transportation was as much as twice the average hourly demand. The potential capacities of our transit systems may be more fully utilized by leveling off the peaks of demand through the staggering of hours of such demand so as to approach a more nearly uniform level of demand throughout the day. It becomes vitally necessary to take this measure in order to meet greatly increased demands.

*Vehicle Loading*: The load per vehicle is an important factor in efficient vehicle use. Every effort must be made to keep the diversity of load between vehicles to a minimum so that uniform loading of vehicles is attained. Headway and schedule maintenance is of prime importance in this connection. Even the interior design and the width and arrangement of seats in vehicles will need alteration on some systems. The "stand-sit" seat design now being developed in Washington promises to increase vehicle seating capacity by as much as 25 to 40 per cent.

*Expedients*: To handle the increased local transportation load by means of public carriers will further require the use of trailers and improvised vehicles utilizing a minimum of critical material. In some places, school buses are being pressed into service throughout the day so that workers as well as school children may utilize the same

vehicle. Careful analysis of the school bus problem in any area will show whether such steps are advisable.

The restoration of old street cars and abandoned tracks can free rubber using buses. In every place where track work is available or can be made usable, buses should not, if possible be substituted for street cars for light off-peak services, as has been practiced in some areas in the past.

*Service Changes*: From a service point of view, the feasibility of skip-stops, turn-backs, express routes, and special routes for particular loads must be more fully studied, and those measures applied in urban areas where local transport burdens are being increasingly forced on the public carriers. Parallel routes will frequently be eliminated, and where railroad service will suffice, inter-city buses may be pressed into service for local transport use.

*Automobile Problems*: While large numbers of urban people will call on public carriers to meet their transportation needs, it has been pointed out previously that over 43 per cent of our population is in rural areas, and it is estimated that fully one-half of our auto use is in rural and suburban areas unserved by local public carriers under normal conditions. In addition to such normal use, the population increases around war plants imposes a load on local transport which must be largely absorbed by passenger autos. Indeed, in many areas from 70 to 80 per cent of the workers depend on autos for reaching their jobs. On a nation-wide basis not more than 15 per cent of the local automobile use can be transferred to public carriers. In large cities nearly all automobile traffic could be handled by local public carriers, but in the rural regions and in the smaller urban areas where the auto is the principle mode of travel, it must continue to carry most of the load and some 85 per cent of the essential local transport problem is up to the automobile.

*Group Riding*: Insofar as loading is concerned, the same principles of traffic economy apply to the auto as apply to the public carrier. In normal times the average auto load was 1.6 to 1.7 passengers. This load factor will need to be increased wherever practicable through the adoption of group riding. This will not be easy, for it entails time and place inconveniences far more severe than those imposed by public carrier under normal conditions, and such inconveniences will have to be endured by the very people who are accustomed to luxury of personalized transportation which the auto provides. This is a most difficult step which will apparently be taken in most cases only under the most stringent enforcement of rationed automobile use or because of dire necessity imposed by the depletion of tires and vehicles. In practice, group riding entails difficulties caused by time and place. Shift changes, irregular overtime demands, lack of communication between members of the group, dispersion of the group in different residential areas and plants or departments of work, legal responsibilities, and many other problems are typical. Difficult as the job may be, every effort, without let-up, should be made to effectuate as much group riding as practicable at all times and places.

*Traffic Control and Facilitation*: The conservation of vehicles by means of traffic control and management is a fertile field to which every traffic engineer available should apply himself in service to the war effort. In addition to the utilization of staggered hours, the promotion of group riding, the revision of routes and schedules, the reduction of mileage and the increase of vehicle loading; he should, wherever deemed essential, see that proper adaptation is given to all of the customary techniques of traffic engi-

neering including the re-timing and re-location of signals, the revision of sign locations, etc. He should see that no factor is overlooked which might mean the difference between failure and success in solving the present critical problem of transportation.

*Vehicle Maintenance*: The importance of conserving vehicles and tires through daily and periodic care and maintenance cannot be over emphasized. Traffic men should co-operate to the fullest extent in helping to carry out this part of the job. According to the Office of Defense Transportation, we normally use annually about 342,000 tons of essential war materials, exclusive of rubber, in the maintenance of motor trucks alone. Proper maintenance can conserve a great deal of this vital material.

*Rubber Control*: While much loose talk has been heard about rubber, the report of the Baruch Committee is accepted as authoritative. This committee found "the existing situation to be so serious that unless corrective measures are taken immediately this country will face both military and civilian collapse."

The Baruch Committee calls for speeds not in excess of 35 miles per hour, a 25 per cent reduction in annual vehicle mileage per car (5000 miles), and nation-wide rationing of motor fuels to effectuate this mileage. The Committee further calls for the allowance of more rubber for recapping (or new) tires for essential driving and periodic inspection of tires. Meanwhile the Committee calls for a voluntary tire conservation program till these measures can be made effective.

The purpose of this is clear. The speed reduction will prolong tire mileage; at 35 m.p.h. on concrete pavement, for example, expected tire mileage is about one and one-half times as great as at 50 m.p.h. While the bulk of urban driving has always been below 35 m.p.h., probably a 50 per cent increase in tire mileage can be expected for rural mileage where car use is so necessary.

The tire recapping and inspection program is most important. A little preventative maintenance will save the entire tire for, when properly used and inflated, it is usually at the tread and not the side walls where tire blowouts occur. Timely application of a little rubber to the treads will greatly prolong the life of the remaining rubber in the tire thereby making for greater economy of rubber use. Compulsory inspection of tires will result in more effective application of the recapping process.

Tire maintenance, however, is not the most effective way to conserve rubber. Constantly we must think of the most effective ways to get the maximum mileages per pound of rubber used and, insofar as practicable, regulate vehicle use to attain this end. Obviously more effective use of rubber on passenger cars will be obtained by carrying full rather than partial loads in each vehicle. Furthermore, it is recognized that a higher rate of passenger mileage per pound of rubber will be obtained by mass carriers than by private cars, and by large carrier units than by small.

Generally we can get higher ratios by carrying full loads in each vehicle and generally mass carriers will give a higher ratio than passenger autos.

*Conclusion*: The problem of local road transport immediately before us is essentially a problem of conservation through traffic control and vehicle and tire maintenance.

The increased demand for local transportation due to war production must be met with the rolling stock available from depression years. Unessential transportation demands for social and recreational purposes must be cut to the bone.

The impingement of measured de-

mands on focal areas must be met through the application of staggering of hours to improve mass carrier performance, and where the bulk of such demand falls on automobiles, group riding must be accomplished. Balance in the use of these two techniques is an individual problem for each community and is dependent largely on local transportation resources and demands. It is a job in which the fullest collaboration and advice of traffic engineers is needed.

The control of unessential traffic movement is a problem of rationing by governmental authority. Here, too, traffic specialists can be most helpful in the analysis of traffic to the end that intelligent rationing may be applied.

Again, the load performance characteristics of vehicles, both private and public, are a vital concern in tire conservation. Traffic analyses by competent traffic specialists are needed not only in matters of performance but in applied control through traffic management of routing, scheduling, etc. Even in matters of expedients, such as minor changes in seating and loading evaluation the advice of traffic men is needed.

Moreover, because of its vital importance, traffic engineers must work in closest harmony with vehicle maintenance efforts.

All these wartime measures represent a considerable change in viewpoint from peacetime objectives. If his work is to contribute materially to the winning of the war, the traffic engineer must orient himself to this new viewpoint. His objectives must be: to move traffic with a minimum of delay and accidents, to achieve maximum efficiency of use of existing vehicle units, and to conserve vehicles, tires, and fuel. Gone for the duration are the days when he could plan and construct superhighways, install intricate and expensive traffic control devices, and indulge in long-term planning which might take years to put into effect. Before the war we were well on the way to a network of streets and highways that were to be the finest and safest in the world, and this achievement was largely a result of the work of trained traffic engineers. Now the ideal must be replaced by the sternly practical, and utility based on the single standard of winning the war must be the only goal. After the war is won, our traffic engineers can go back to the work they have so splendidly begun. But until that day, they have a duty to see to it that our street and highway transportation system continues to function efficiently for the duration of the war.

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PROGRESS BULLETINS — Highway Traffic Advisory Committee

# TRANSPORTATION CONSERVATION AND THE TRAFFIC ENGINEER

THE common objective of all programs of war production transportation conservation is to get the maximum passenger and ton mileage with the minimum of rubber mileage.

Traffic engineers are obligated to participate in achieving this objective in addition to carrying out their normal duties of regulating civilian traffic by means of signs, signals, markings, etc.; conducting studies, facilitating military movements; and preparing plans for war disaster; i.e., dimouts, blackouts, air raids, evacuations and interceptor traffic cordon posts at war industries.

Policies and directives have been issued by the Office of Defense Transportation and the National Highway Traffic Advisory Committee to the War Department. The programs which have been developed by these agencies are broad and are the concern of not only traffic engineers, police, motor vehicle and highway officials, but also transit engineers, school authorities, plant managers, state and local government executives and many business and civic organizations.

While portions of these programs do not relate to traffic engineering, others lend themselves to techniques and procedures thoroughly familiar to the traffic engineer. It is in these parts of war production transportation and in the community organizational aspects that the traffic engineer has a vital obligation to perform.

The need for action is well-known to technical men. It now remains to determine what must be done and how to obtain results.

Some of the elements involved demanding attention by traffic engineers are:

Staggered hours
Fewer transit stops
Extension of bus service to war plants and army and navy centers
Use of school buses for transporting war workers
Group riding in all its phases
Walk to work programs
Special surveys at war plants
Special studies for expediting war goods in and out of production areas

Other items contained in the O.D.T. and H.T.A.C. programs come within the traffic engineer's scope of work. Other items not covered in either program might well be developed. It suffices here to review only some of the basic studies and procedures fundamental to each of the above stated elements of the O.D.T. and H.T.A.C. programs. It must be remembered, however, results are so urgent that exhaustive surveys must be dispensed with for the time being and the traffic engineer must have the courage to make decisions based largely on his past training and experience in related projects dealing with his everyday duties of expediting civilian traffic.

The first three of these projects should be undertaken only in close cooperation with local transit engineers.

*Staggered Hours*: The primary aim of staggering the hours of industry, business offices, schools, etc., is to level the transit and traffic peaks so that available transportation equipment and man hours can be used most efficiently to transport workers and materials into and out of essential industries. Every community having a public transportation system should study the need of a staggered hour program, the method

of effecting such a program, and the results which can be anticipated. Even if local conditions do not indicate the need of staggered hours, such a program may make it possible to release vehicles to other communities facing acute transportation shortages.

On the other hand, the staggering of hours should not be undertaken simply as a popular war-time move but only when such a program will definitely serve the primary aim. An unnecessary staggered hour plan or one not adapted properly to the problems of the community, may and probably will create very unsatisfactory conditions and weaken public acceptance of necessary war-time plans.

To consider a staggered hour program a committee vested with recommendatory powers should be created. This committee should obtain data regarding the opening and closing hours and the number of employees from as many concerns as possible. It should also plot fluctuation volumes of passengers traveling in automobiles and public vehicles and estimate the trends in mode of travel from auto to buses and trolleys. If the study indicates the need of a staggered hour plan, the committee should develop a plan which will give the maximum capacity with the minimum number of vehicles. Plans should be drawn of the downtown transfer and loading points and for each critical line. Each firm involved should be informed of its new hours and the plan should be sold to all parties concerned by plausible and understandable arguments.

A few of these arguments which have been used successfully are listed here for your consideration: The changing of industrial employees from male to female will increase use of public vehicles. Rides may have to be rationed and war workers given priority, if the situation becomes acute. Production losses will become greater, resulting from employees not getting to work on time or being out sick—caused by inevitable delays and waiting on the curb under bad weather conditions. Staggered hours will provide better and faster rush hour transportation for workers. It also lays in a stock of seats against an abnormal future demand when the supply of vehicles will be decidedly limited. As the cost per mile of using automobiles rises, resulting from gasoline rationing, many of the present motorists will change to the public vehicles. Possible emergencies in war production areas demand that traffic congestion be kept to a minimum on access roads to assure the easy flow of emergency vehicles. Several expanded plants in a community, letting out employees at the same time will over-burden public transportation facilities. Staggered hours appeals to the motorists. It lowers congestion and reduces the number of stops and duration of delays and consequently saves gasoline which is wasted waiting in traffic. New vehicles are difficult to obtain and a community must have a plan of staggered hours in effect to qualify. Without staggered hours a certain number of additional vehicles would be neccesary and these are not available. Passenger riding on public vehicles is increasing. A sound plan of staggered hours will cause inconveniences and disrupt home life but the disruption will be less severe than if haphazard staggered hours are put into effect in a futile attempt to keep the city's circulation system functioning.

*Fewer Transit Stops*: Skip stops along public transportation lines speeds up schedules by reducing the frequency of stops.

The basis of such a study will involve the preparation of maps showing transit routes. Speed and delay studies are valuable, especially when before and after time zones are superimposed upon population or land use

density maps. Selection of stops must be studied in relation to tributary pedestrian and transportation facilities. Rerouting of transit lines, establishment of new lines, express services and all other public transportation operations should be carefully considered when locating stops.

*Extension of Services*: Demands are being made for special services to war plants and other war centers. These war plants and centers should be mapped and studied in relation to regular services, mode of transportation and origin and destination of workers. New transfer points and location of district parking lots should be surveyed as alternative possibilities.

*Use of School Buses for Transporting Workers*: A reservoir of transportation is available in school buses. Careful thought, however, must be given to existing services, employment and resident centers of workers, opening and closing hours of schools and industries involved, number of workers involved, capacity and suitability of the available school buses, their routes, garages and schedules.

Other elements enter into this study —financial arrangements, control, disruption of family and school life and effect upon the children themselves— distance to bus stops, waiting for buses before and after school and safety and supervision. Cooperation is essential between school authorities, public utilities commissions, bus operators and motor vehicle authorities.

*Group Riding*: Decentralization of population, greater reliability of the urban dweller on the automobile and a consequent contracting of transit facilities before the war gives the automobile a vital role in war production transportation. While the car is essential, all unessential driving must be dispensed with for maximum conservation. Group riding or sharing of rides among motorists offers great possibilities.

Recent actions taken by O.P.A. in connection with its rationing program and by O.C.D. in recognizing Share-the-Ride efforts as a function of civilian defense have made possible preplanned grouping of motorists in industrial and business concerns and among motorists in general, especially if additional gasoline rations are requested. Progress in group riding is being retarded only by the lack of detailed procedures and sufficient staff to organize and operate, what has aptly been termed, "Rides Bureaus" for grouping of motorists. Maximum conservation will not, however, be obtained from group riding until the motorist and the public official become more conscious of the need for approaching this problem as a continuing responsibility rather than as a passing phase of a promotional publicity scheme.

"Rides Bureaus" or centers where persons can be assisted in forming or joining riding groups can be organized and operated with a considerable degree of success in industrial and business concerns, military and naval stations, retail store groups, government offices and colleges because employees are designated to do the work.

Rides centers operated by volunteers, when available, and relying upon volunteer action by motorists do not render the same results. More selling is necessary among small concerns and offices in churches, neighborhood clubs, shoppers, and throughout the community.

All approaches require a knowledge of origin and destination of persons involved, time of travel and car capacity. Those in charge of forming the groups must know whether the motorist desires to swap rides, take passengers or ride with other motorists regularly. A procedure must be selected which will group the maximum number of riders.

Files and procedures for termina-

tions, change of shift and address, new employees and rearranging club members must be provided. Cross files in industrial and business concerns and a community headquarters will be necessary when certifying of supplementary gasoline forms is interwoven with Share-the-Ride by O.P.A. This is a problem that is here to stay and should be set up properly to avoid unnecessary and wasted effort and disappointing results. Traffic engineers familiar with accident spot mapping and record keeping will find this work and Share-the-Ride procedure similar.

*Walk to Work Programs*: O.D.T. is encouraging workers within two miles of their place of employment to walk to work. Mode of transportation studies in connection with group riding at employment centers will supply the data on the number of workers now walking and the number within reasonable walking time of work. Population spot maps, topography and natural features of the area will aid in this study. Demands for public transportation on the outskirts and controls over private and public transportation must be known. Close cooperation with transit engineers and a careful promotional program is essential.

*Special Surveys at War Plants*: Unprecedented expansion or the establishment of new plants often cause problems of movement and parking on plant property and access roads. Detailed studies should be made of available parking areas and arrangements, curb parking regulations, adjacent land uses and possibilities of utilizing additional vacant land for parking. Traffic volumes and turning movements at shift changes and possibilities of new routings, including one-way streets, etc. should be studied.

Careful field observations of pedestrian movements in relation to main highway crossings and public transportation stops are a *must*. In some cases only by new construction can the problem be brought under control. These are traffic control problems pure and simple and contribute much to transportation and manpower conservation.

*Special Surveys for Production Areas*: Problems often arise in areas of expanding activity between plants served by the same route or street and the same terminals. Staggering of the hours may be necessary solely to avoid passenger and truck traffic congestion at points of converging traffic streams. Loading zones and bays may be served by one traffic throat and parked cars and other inconveniences delay service. In this case the maximum traffic period must be balanced against available parking and loading spaces and may make necessary the establishment of drastic traffic regulations, use of adjacent playgrounds or the complete rerouting of traffic and the construction of new entrances. These traffic surveys are clearly related to those for plant protection against emergencies when all routes leading to the area must be kept free for emergency vehicles and unessential traffic is kept moving parallel to or away from the critical production areas.

*Conclusion*: Additional studies and suggestions could be stated for the above problems and other problems included demanding the traffic engineer's attention.

His is an important assignment, for under the stress of wartime conditions public spirited and well-meaning citizens have a tendency to pick isolated parts of a major war transportation program and concentrate upon some part without giving proper consideration to all the facts or without looking at the program as a whole. All too numerous are the occasions when money and valuable time have been lost by jumping to conclusions about traffic matters without proper study or competent traffic advice.

War Production and its essential transportation are four times as important today as in the last war. It took only five men on the production line then. Today it takes 19 on the production line to keep one man on the fighting line.

The traffic engineer serves a two-fold function — one as an engineer thoroughly conversant with the operating characteristics of street and highway movement—the other as an organizer and administrator of community activities. His experience in public relations and publicity on matters of traffic safety are sorely needed now on transportation conservation. He must guide the building up of a sound technical approach and at the same time must be the spark plug of organizing a plan of action which will breathe life into inanimate plans if they are to bring results and he is to be more than an animated slide rule in the war effort.

Coordination of effort and the acceptance of assignments in a cooperative spirit should be the keynote of action.

The duty of the traffic engineer is to establish by accomplishment a desire on the part of the community and his superiors to route all traffic questions at their inception to him for his expert review and advice.

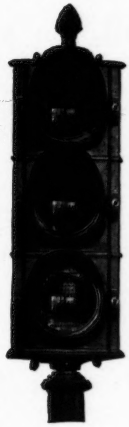
His past record should enable him to point to economical solutions to difficult problems. His is the role of the doctor probing sore spots—congestion, high accident locations, vulnerable locations to the traffic system and the best way of prolonging necessary public and private transportation.

Today's problems involve the broader aspects of transportation and are not limited to traffic control only, with signs, signals and markings which some seem content to emphasize. Traffic regulation and accident reduction are as important as prior to the war but today they are inextricably woven into traffic resulting from war disaster activities and war production transportation of workers and materials.

The traffic engineer has specialized knowledge. His need must be firmly established in the minds of public officials and the soundest manner to proceed is to produce several effective answers for some of the problems troubling those persons delegated with responsibility for directing the activities of local Civilian Defense Councils and War Transportation Committees.

**SPECIAL GREETINGS**
**to**
**Traffic Engineers Overseas**
**for a**
**Merry Christmas**
**and a**
**Successful New Year**

## ELECTRIC SIGNALS



Standard signals adapted for all types of mounting. Synchronous and induction control mechanisms and accessory devices.

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When signs are not enough or expense is a factor, reflector signals keep down both cost and accident rate.

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Large Stimsonized and standard reflector button signs for all traffic conditions.

72" SIGN
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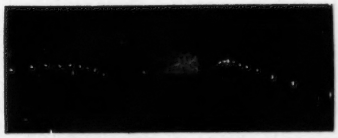

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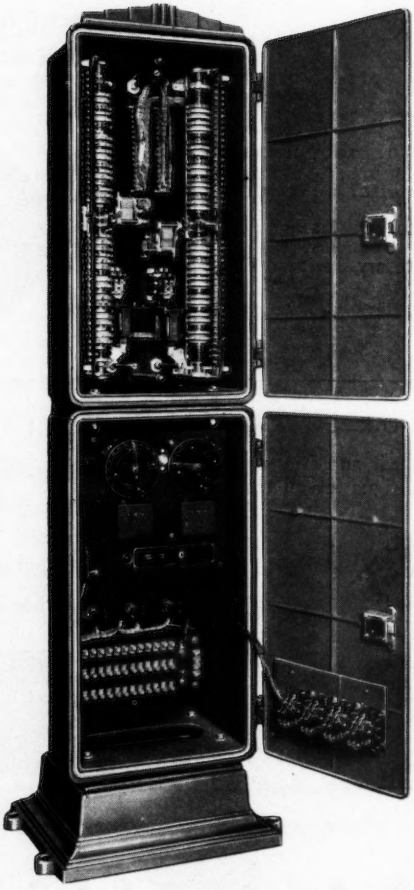

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# MOTOR VEHICLE TRAFFIC TRENDS

THE Committee on Engineering Research of the Institute of Traffic Engineers is continuing to collect information on motor vehicle travel trends. Data received on traffic volumes are submitted to the United States Public Roads Administration for incorporation with information they regularly collect. As new summaries are prepared, they are made available through the courtesy of the Public Roads Administration to "Traffic Engineering."

The first analysis of facts collected by the Committee was printed in the August, 1942 issue of "Traffic Engineering." Data collected since then are presented herewith. Trends are best evidenced by a comparison of both articles.

## VEHICULAR SPEEDS

*Missouri*: Periodic speed surveys on rural state highways are being continued by the Missouri State Highway Department. These studies are made between 7:00 A.M. and 5:00 P.M. under conditions and at locations favorable to high speeds. Studies have been made since 1941.

Results indicate that the average passenger vehicle operator has reduced his speed approximately eight miles per hour, but that 75 per cent of all passenger vehicles still travel more than 40 miles per hour. Light and heavy trucks have shown little if any speed reduction. Buses show about the same reduction as passenger cars.

Some of the results are given in the following tables:

| | 1941 | 1942 | | | |
|---|---|---|---|---|---|
| Average speeds for: | Year | Jan. | Apr. | July | Sept. |
| Passenger Cars .. | 54 | 53 | 51 | 50 | 46 |
| Light Trucks .... | 47 | 46 | 46 | 45 | 43 |
| Heavy Trucks .. | 43 | 43 | 44 | 43 | 41 |
| Buses ..... | 55 | 55 | 56 | 49 | 46 |

*Delaware*: In lieu of legal authority to limit speeds to 40 miles per hour, the Delaware Highway Department undertook to encourage observance of this limit. Under the direction of W. B. McKendrick, Jr., Traffic Engineer, signs captioned "Speed—40—Please" were placed over existing 50 and 55 mile per hour signs. Three hundred of the signs were made of "Pretreated Processed Cellotex" and were bolted over the standard metal signs. The cost of the signs, including erection, was about 90 cents each.

Spot speed studies were made at 19 locations to ascertain the effectiveness of the signs. It was found that passenger car speeds dropped approximately 10 miles per hour and truck speeds about 15 miles per hour.

The 85 percentile speeds were as follows:

| | 85 Percentile Speeds (MPH) | | | |
|---|---|---|---|---|
| | Two-way Highways | | Divided Highways | |
| | 1940- | | 1940- | |
| Type of Vehicle | 41 | 1942 | 41 | 1942 |
| Delaware Passenger | 52 | 40 | 54 | 43 |
| Foreign Passenger | 53 | 42 | 59 | 48 |
| Total Passenger | 52 | 42 | 56 | 45 |
| Delaware Trucks | 43 | 40 | 46 | 41 |
| Foreign Trucks | 46 | 41 | 47 | 43 |
| Total Trucks | 44 | 40 | 47 | 42 |

Studies in 1940-41 showed 23 per cent of the passenger cars on two-way highways at 40 miles per hour or less, while 1942 surveys revealed 81 per cent traveling at or below 40 miles per hour. For trucks and buses, the figures were 53 per cent and 84 per cent respectively.

On divided highways, the number of vehicles at or below 40 miles per hour changed from 15 per cent to 63 per cent for passenger cars and from 44 per cent to 73 per cent for trucks.

*Ohio*: Harry Neal's Division of Traffic and Safety, of the Ohio Department of Highways, has made comparative speed surveys at 75 locations on rural highways. In 1941, 15,000 observations were made at 75 locations, and in the summer of 1942, 14,728 observations were made.

# *the* IDEAL MATERIAL FOR ALL TYPES OF HIGHWAY SIGNS . . .

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***24 Hour Visibility***

Around the clock traffic demands 24 hour visibility clearly marking highway traffic hazards and directions. "Scotchlite" is recommended because it is clearly visible at long range. Legends are easily read at maximum reading distances.

"Scotchlite" is a flexible reflective sheeting readily adaptable to all types of signs. Adhesive backing minimizes installation cost—bolts, housings or extra fixtures are not necessary.

"Scotchlite" can be silk screen processed or hand lettered. Don't postpone getting complete information on this new 24 hour reflective sheeting—write today . . .

"Scotchlite" is available in the following size rolls:

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Price upon application.

"SCOTCHLITE" is a trade-mark of Minnesota Mining & Mfg. Co.

*by* DAY

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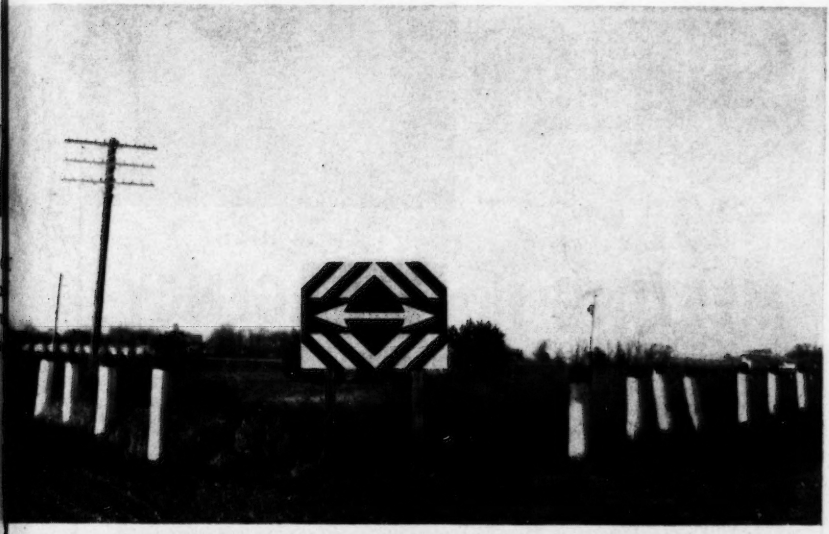
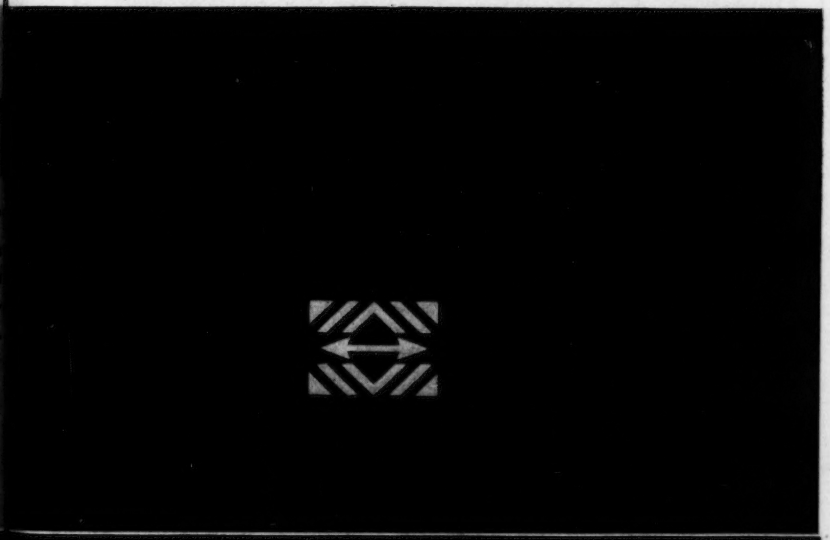
**MFRS. OF 3-M PRODUCTS** 3-M Abrasive Paper and Cloth Products — "Scotch" Tap 3-M Elastic Cements — 3-M Wax and Sealer — 3-M La ping and Grinding Compound — 3-M Cutting and Finishing Compound — 3-M Roofing Granu





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# MEETING the EMERGENCY

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**FOR BLACKOUTS**
Available in luminous finish to reflect *with* light and glow *without* light —a recent foreign development.

"REFLECTO-CHAIN" *is the quick solution to the emergency created by the shortage of steel.* The answer to Defense restrictions. It can be readily applied to metal, however it is even more easily attached to *Wood* or *Plywood.* Flexible as a string. Any size or style of letter, figure or symbol, can be formed and easily mounted by means of its special screws or nails. If required, it can be furnished to function with complete invisibility from overhead, and, without impairing its horizontal effectiveness. Old or new signs, of any size and type, can be quickly and inexpensively converted into Reflector Signs by using "REFLECTO-CHAIN." The treatment can be with single, double or triple rows of buttons, also by designs, (note illustration) and with different reflecting colors. Write for descriptive literature and prices "Reflecto-Chain" and also Reflector Pavement Markers. Send for trial shipment today.

Manufactured under U. S. Patents Numbers 2,240,777; 2,113,759.

The report on these studies shows:

1. 90 per cent of all vehicles were traveling at or below 53 miles per hour in 1942—a reduction of 5.5 miles per hour over 1941 figures
2. The 50 percentile, or median, speed likewise dropped 5.5 miles per hour
3. An increase in observance from 23.2 per cent to 45 per cent occurred in the 40 miles per hour limit

The Ohio report contains the following comparison of the observance of 40 mile per hour limits in several states:

| | Per Cent At or Under 40 MPH | | |
|---|---|---|---|
| State | Before 1942 | In 1942 | % Increase |
| Ohio | 23 | 45 | 22 |
| Virginia | 14 | 48–64 | 34–50 |
| Illinois | 28 | 40–50 | 12–22 |
| California | 29 | 48 | 19 |
| South Dakota | 31 | 53 | 22 |
| Missouri | 18 | 20 | 2 |

*Seattle*: Studies made by Arch Bollong, Traffic Engineer, show decided reductions in driving speeds in the city of Seattle. While a large percentage of the motorists were driving 5 to 10 miles per hour in excess of legal limits prior to 1942, they are now driving much more moderately and at limits requested for conservation purposes. While speeds of 30 miles per hour were common in 25 mile per hour zones and speeds of 45 to 50 miles per hour common in 35 mile per hour zones, recent surveys show that the reductions have been general and in only exceptional cases are the zoned limits exceeded.

*South Carolina*: Speed studies at five locations on rural state highways were conducted in August. The locations had been previously studied in 1941 and in July, 1942. Trends are indicated in the following table:

SPEED DATA
All Passenger Cars

| Speed | 1940 | July 1942 | Aug. 1942 |
|---|---|---|---|
| Average | 44 | 41 | 42 |
| 85% | 54 | 48 | 48 |
| Pace | 40–50 | 35–45 | 35–45 |

Speed checks on a city street in September showed an average of approximately 25 miles per hour, as compared with an average of 30 miles per hour in 1939. Eighty-five percentile speeds dropped from 35 miles per hour to 30 miles per hour. While approximately 10 per cent of the motorists were exceeding 35 miles per hour (the legal limit) in 1939, only 3 per cent were exceeding this speed in September, 1942.

*Survey by Public Roads Administration*: The action by states in response to the President's request for a 40 mile per hour speed limit was reported by Public Roads Administration on September 10, 1942. The report shows that ten states either enacted new speed laws or were able to effect new speed laws through proclamations and resolutions. Up until that time the other 38 states did not change their laws, even though all but nine had requests from the governor or other empowered officials for compliance with the President's request.

## OCCUPANCY

*New Orleans*: Jim Gibson has furnished some interesting information concerning the number of passengers per vehicle at various points in the city of New Orleans. These counts show trends in occupancy since 1931. The average occupancy for the period 6 A.M.-10 P.M. is shown for each of the studies in the following table:

VEHICLE OCCUPANCY AT TWO LOCATIONS IN NEW ORLEANS
6:00 A.M.–10:00 P.M.
Location #1

| Date | Passengers Per Car Leaving Business District | Entering Business District |
|---|---|---|
| 10-28-31 | 1.96 | 1.87 |
| 10-14-36 | 1.88 | 1.89 |
| 5-13-42 | 1.96 | 2.02 |
| 6-10-42 | 1.99 | 2.04 |
| 6-11-42 | 2.02 | 2.14 |
| 7- 8-42 | 2.01 | 1.99 |
| 8- 5-42 | 1.99 | 1.99 |
| 9- 2-42 | 1.98 | 2.03 |

| | Location #2 | |
|---|---|---|
| 10-28-31 | 1.76 | 1.78 |
| 10-14-36 | 1.76 | 1.75 |
| 5-27-42 | 1.75 | 1.80 |
| 5-28-42 | 1.81 | 1.81 |
| 6-24-42 | 1.79 | 1.84 |
| 7-22-42 | 1.78 | 1.84 |
| 8-19-42 | 1.79 | 1.84 |

Mr. Gibson points out that while the average occupancy has not increased very much, there has been a decided increase in occupancy during the early morning hours (6 A.M.-7 A.M.). Average occupancy figures for each hour show that the rate of increase in the late afternoon and evening hours reaches a peak between 8 and 10 P.M.

*Johnstown, Pennsylvania*: Dwight Myers has conducted comprehensive cordon counts for the downtown business area of Johnstown. The following table shows the comparison of the average occupancy of vehicles in June, 1941, and July, 1942.

| Type of Vehicle | 1941 | 1942 |
|---|---|---|
| Passenger | 1.7 | 1.8 |
| Commercial | 1.6 | 1.5 |
| Bus | 12.4 | 16.9 |
| Street Car | 18.3 | 20.1 |

## VOLUMES

*U. S. Public Roads Administration*: Cooperating with the Committee on Engineering Research, the U. S. Public Roads Administration has made available the preliminary results of volume counts furnished from automatic recorders in twenty-one states. These data indicate a decrease of 35.7 per cent for July, 1942, as compared with July, 1941. Within the rationed area of the country the decrease in travel was 41.7 per cent, that in the unrationed area 28.3 per cent. The following table shows the fluctuations by states:

Preliminary Summary of Automatic Traffic Recorder Data for July 1942, including 202 Stations in 21 States

| | STATE HIGHWAYS | | |
|---|---|---|---|
| State | Number of Stations | Total daily traffic July 1942 | Percent decrease from July 1941 |
| Arizona | 4 | 10,564 | 10.7 |
| Arkansas | 16 | 17,983 | 27.2 |
| Connecticut | 18 | 77,685 | 41.6 |
| Delaware | 5 | 17,568 | 28.8 |
| Georgia | 4 | 6,414 | 41.0 |
| Idaho | 5 | 10,499 | 26.3 |
| Illinois | 6 | 11,420 | 32.5 |
| Indiana | 20 | 43,703 | 29.3 |
| Louisiana | 7 | 17,303 | 34.1 |
| Maryland | 5 | 10,789 | 41.1 |
| Massachusetts | 9 | 39,149 | 45.8 |
| New Mexico | 10 | 13,715 | 26.5 |
| New York | 10 | 36,113 | 38.5 |
| North Carolina | 19 | 31,619 | 36.7 |
| North Dakota | 7 | 3,324 | 29.3 |
| Oklahoma | 20 | 38,686 | 26.7 |
| Rhode Island | 3 | 6,214 | 49.5 |
| South Carolina | 6 | 6,102 | 36.7 |
| South Dakota | 9 | 8,602 | 23.2 |
| Utah | 5 | 5,694 | 32.4 |
| Virginia | 2 | 2,795 | 53.4 |
| 21 States | 190 | 415,941 | 35.7 |

The report further states that "Both the foregoing tabulations are measures of traffic volume changes on rural highways. Data from 15 toll facilities in states along the Atlantic seaboard and within the rationed area show a decrease of 32.3 per cent in total traffic for the period June 29 to August 2, 1942, as compared with a similar period in 1941. At these toll facilities passenger car traffic decreased 36.1 per cent, while commercial vehicle traffic increased 1.6 per cent. Traffic on these facilities consists largely of urban vehicles.

"Data from 13 points of heavy traffic volume within the District of Columbia for July, 1942, are 19.75 per cent below that for July, 1941. This traffic is almost entirely urban and is also affected by the considerable population increases in the metropolitan district within the past year."

The Committee on Engineering Research will continue to collect information showing trends in motor vehicle travel and use. All Institute members are urged to forward such information to Wilbur S. Smith, Traffic Engineer, S. C. State Highway Department.

## ON THE SHELF

*War Production Transport*: Reprinted from Traffic Engineering, April, 1942. Published by Institute of Traffic Engineers, 60 John St., New York City.

*Conservation of Vital War Transportation*: Procedure and Methods published by Office of Defense Transportation, Division of Local Transport, Washington, D. C.

*A Manual on the Conservation of Vital War Transportation and Manpower*: Four parts: Staggering of Hours; Share the Ride; Enforcement; Better Use of Streets. Prepared by Michigan State Safety Commission, Lansing, Michigan. June 1942.

"*Organization for a War Transportation Conservation Program*": M. N. Halsey, Executive Secretary, Michigan Safety Commission in *Traffic Engineering*. July 1942.

"*War Transportation Program*": F. W. Fisch, Director, Bureau of Traffic and City Planning, Schenectady, N. Y., in *Traffic Engineering*. July 1942.

"*Conservation of Vital War Transportation*": A. B. Barber, Manager, Transportation and Communication Department, Chamber of Commerce of United States, in *Traffic Engineering*. September 1942.

"*Handling War Traffic*": By four experienced traffic engineers. Published in *American City*. May 1942.

"*O.D.T. and Highway Traffic*": Honorable Joseph B. Eastman, Director, Office of Defense Transportation, Washington, D. C., in *Traffic Engineering*. February 1942.

*Essential Wartime School Hours, Buffalo, New York*, Transportation Technical Committee, Buffalo, July 1942—Plan for the staggering of school hours in Buffalo, New York, graphically illustrated.

*Basic Principles for Staggered-Hour Studies*: Hawley Simpson, Research Engineer, American Transit Association, 292 Madison Avenue, N.Y.C. Paper presented before 61st Annual Business Meeting, American Transit Association. 10 pages (mimeographed).

*No Royal Road to Staggered Hours*: Earl F. Theisinger, Managing Editor, *Bus Transportation*. September, 1942: Reprints available from Civic Planning and Traffic Board, Providence Chamber of Commerce, 162 Westminster Street, Providence, R.I.

*Staggered Hours Plan for Houston, Texas*: June 1942. Complete with charts, graphs, etc. Write Thomas E. Willier, Local Transport Administrator and Traffic Engineer, Houston, Texas.

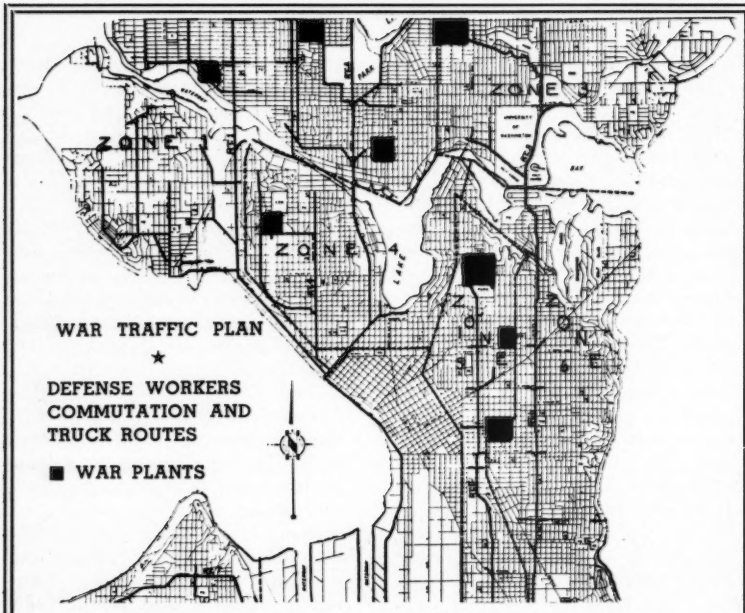
*Staggered Hours Plan for Atlanta, Georgia*: June 1942. Prepared and published by Traffic Safety Committee, Atlanta Chamber of Commerce, Atlanta, Georgia.

*Traffic and Employment Study for New Haven, Conn.*: K. T. Healy and T. M. Matson. Published by Emergency Transportation Committee, New Haven Chamber of Commerce, New Haven, Conn.

*Transportation Survey for Bridgeport, Conn.*: March 1942. Prepared by Hawley S. Simpson for Bridgeport Chamber of Commerce, Bridgeport, Conn.

*Staggered Hour Survey for Cincinnati, Ohio*: Prepared and published by Traffic and Safety Division, National Conservation Bureau, 60 John Street, N.Y.C., for Cincinnati Street Railway Co.

*Staggered Hour Study for Hartford, Conn.*: Conducted by Hartford War Transportation Committee in cooperation with Conservation Bureau of the Hartford Chamber of Commerce and the National Conservation Bureau, New York City.




# TRAFFIC SIGNALS AID WAR EFFORT

Municipal and traffic engineers today can do much to aid the war program in their communities. Many of them are doing so. The smooth, safe flow of traffic in war or defense areas was never more important than now.

**WAR PLANTS** require free movement of men and materials.

**WAR PRODUCTION BOARDS** recognize the need for traffic signals in war areas and have granted required priorities.

**COUNCILS OF CIVILIAN DEFENSE** require emergency traffic to move during blackouts and permit all traffic movement during dim-outs.

**EAGLE SIGNAL CORPORATION** can provide you with proper blackout and dim-out traffic controls and new traffic signal equipment for war areas.

There is no need or requirement for destroying the effectiveness of traffic signaling systems during peak loads in order to comply with government blackout or dim-out regulations.

***Eagle equipment solves both problems.***

Eagle Signal Corporation is always ready to assist municipal and traffic engineers. Consult them without obligation.

*Invest in Liberty by Buying War Bonds*

**EAGLE SIGNAL CORPORATION**

**MOLINE ILLINOIS**

*Staggered Hour Analysis for Seattle, Wash.*: J. W. A. Bollong, Traffic Engineer, September 1942.

GROUP RIDING

*Program for Automobile Group Riding in the City of Providence, R. I.*: Report and analysis prepared by the Civic Planning and Traffic Board of the Providence Chamber of Commerce, Providence, R. I. Charts, tables, forms, etc. (25 postage.)

*A Program to Promote Car Sharing in the Chicago Metropolitan Area*, Office of Civilian Defense, Chicago Metropolitan Area, Chicago, July, 1942—A 3-sheet folder on group riding, explaining "What We Do" and "What You Do" for the sender and recipient of group riding material, respectively. Single copies obtainable upon request to Group Riding Campaign Division, Office of Civilian Defense, Room 1940, 20 North Wacker Drive, Chicago, Ill.

*Voluntary Car and Tire Conservation Moves Ahead*—A progress report on voluntary conservation of civilian motor vehicles, by Automotive Safety Foundation, Tower Building, Washington, D. C. July 1942.

*Summary of Developments in the Local Passenger Transport Conservation Program*, United States Chamber of Commerce, Washington, D. C., July 31, 1942—Resumés of action taken in 120 cities, especially on staggered hours and group riding, and also information on organizational set-ups and traffic surveys undertaken. Copies available upon request to the Transportation and Communication Department of the Chamber of Commerce, Washington, D. C.

*Employee Transport Plan for War Industries*: Prepared by Traffic and Safety Bureau of Liberty Mutual Insurance Company, Boston, Mass. 19 pages, complete with instructions.

*Share-Ride Plan for Industrial and Business Concerns*: How to organize and operate a Share-Ride Program for your employees. Prepared jointly by the Civic Planning and Traffic Board of the Providence Chamber of Commerce and Liberty Mutual Traffic and Safety Bureau. Write Providence War Transportation Committee, 162 Westminster Street, Providence, R. I.

*"Five Stages of Swap Ride"*: Maxwell N. Halsey, Executive Secretary, Michigan Safety Commission in *Traffic Engineering*, September 1942.

*School Transportation in Wartime*: A handbook prepared for and approved by National Council of Chief State School Officers. Published by American Automobile Association, Washington, D. C. 101 pages. Price 50c.

*Navy and Transit Company Attack Norfolk Problem*: H. F. Hammond, Consulting Traffic and Transportation Engineer, Naval Operating Base, Norfolk, Virginia, and Director, Traffic Division, National Conservation Bureau, New York City.

*Staggered Hours Planning for War Transportation*: Paper presented before the National Association of Chamber of Commerce Secretaries in Detroit, October 1942, by George F. Hines, Providence Chamber of Commerce, Rhode Island.

*District Parking Lots*: D. M. McCracken, Director, Traffic and Safety Bureau, Liberty Mutual Insurance Co., Boston, Mass. in *Traffic Engineering*, July 1942.

*Tomorrow's Tires*: Norman Damon, Vice-President, Automotive Safety Foundation, Washington, D. C., in *Traffic Engineering*, August 1942.

*Transporting War Workers in Portland, Oregon*: R. Collett *in Traffic Engineering*. May 1942.

*Traffic*, Los Angeles Traffic Association, Los Angeles, July 1942—A report on the activities of the Association since January, 1942.

## O. D. T. PROGRAM GAINING RESULTS

War Transportation Programs have been instituted or are in the process of being organized in all states as a result of Mr. Eastman's request to Governors and Mayors.

More than 500 state and local war transportation administrators had been appointed by July 1.

Staggered hours already have been instituted to varying extents in 43 cities and surveys preparatory to staggering hours are in progress in 42 others.

Industry-promoted group riding programs are also producing results. The load factor at the Glenn Martin plant near Baltimore is approximately 4.3 persons a car, as compared with 2.6 before the first of the year.

In Providence, the load factor for 110 industries with 50 or more employees is approximately 2.6 on the average.

Several of the State war transportation committees have been given legal status by their State Legislatures and appropriations to finance their work. Two ordinances have been passed in Kansas City, one giving legal status to the local administrator and the other authorizing group riding.

Victory, July 21, 1942

## SALESMEN CUT TRAVEL IN GEORGIA

Georgia automatic counters show a decrease in rural travel of 48 per cent during the first 3 months of 1942.

Decreased use of automobiles by travelling salesmen is given as a reason for the large decrease. There has been an approximately 75% decrease in travel to Atlanta from towns over 30 miles distant.

Atlanta parking lot and garage trade as of March 1942 is 24.7 and 15.1 per cent respectively below March 1941.

## GASOLINE SAVING

A resident of Ashland, Ohio advocates placing a small sign beneath all traffic lights giving the miles per hour for the motorist to drive to reach the next light on the green. The proponent of these signs offers this suggestion to conserve on gasoline and apparently recommends that these speed signs change with traffic density.

## CAR POOLING

The Los Angeles newspaper, The Examiner, has established a clearing house for information to bring together drivers and riders. The Los Angeles Examiner carrier-salesmen distribute card questionnaires which are returned by the motorist and compiled by the staff of the Examiner.

## PREFERRED ROUTES

The states of Washington and Oregon are completing an origin and destination survey that will provide very valuable information as to travel through and between the two states.

The survey was originally intended to provide information as to extent of use of the existing bridges and ferries crossing the Columbia River, and to determine where additional bridges should be constructed if such construction was found to be necessary.

It was found, however, that by a relatively small additional expenditure much information could be obtained as to the routes traveled through each state. Accordingly a number of additional stations were established throughout each of the two states. Some idea of the magnitude of the survey may be obtained when it is remembered that it is approximately 525 miles from Seattle through Washington and Oregon to the California line.

Some field work was cancelled because of the war, but the data already obtained are now being analyzed.

BEST FOR STRENGTH
BEST FOR VISIBILITY
BEST FOR LOW COST

About 8000 ft. still available from stock on hand
PLENTY MORE AFTER THE WAR

TUTHILL SPRING CO. - CHICAGO, ILLINOIS

## WAR BRINGS MID-WEEK SHOPPING NIGHT

Months ago Boston store executives decided to keep their stores open Wednesday evenings to provide more time for defense workers with a heavy schedule of first aid Red Cross and air raid warden classes to shop in the central districts. Since instituting the Wednesday night 9 p.m. store closing, the desire for saving gasoline and rubber has caused a greater increase in the use of public transportation with consequent better schedules and more enthusiasm for the late store closing. People who were too busy with defense work and other business to shop during the day are now flocking into the central district of Boston on Wednesday evening. Now New York, Chicago, Washington and other cities are adopting Wednesday evening shopping.

## NEW CENTER STRIPING

Utah State Highway Department reports the use of Gilsonite, an asphalt found near Fort Duchene, Utah, as a substitute for conventional traffic paints using critical materials. The application of Gilsonite to black asphalt surfaces will be accompanied by white granite chips, according to Utah Highway officials.

## IACP WAR CONFERENCE

The International Association of Chiefs of Police War Conference held at the Hotel Pennsylvania, New York City, September 21-23 created nationwide interest. The New Jersey Association of Chiefs of Police cancelled their own plans for their Annual Dinner in favor of the New York City War Conference. Key men in the war effort led panel discussions on war emergency police duties.

## O. AND D. SURVEY METHODS

An interesting trial survey to obtain origin and destination, volume, vehicle classification, speed and delay data all in one operation is submitted here by L. E. Bender (Assoc. Mem. I.T.E.), Assistant Traffic Engineer, State Highway Commission of Indiana.

The object of this study was to find out: 1. What part of the traffic on U. S. 52 had its origin or destination in Lebanon. 2. How many vehicles not having Lebanon as their destination stopped. 3. How long it takes a vehicle to pass through Lebanon on the marked routes. 4. Vehicular classification. 5. Vehicular volume.

The method used was the license tag method commonly used in O.&D. studies with some additions. To eliminate the possible duplications in license numbers found in using the last four digits, the entire license number, classification, and state registration was called into a dictaphone. The dictaphone also eliminated the error occuring between reading and writing the numbers. It was found that in heavy traffic volumes, it was necessary to have a caller and recorder for each lane of traffic. From previous experience, the transmitting of the numbers caused many mistakes and many license plates were missed. Therefore dictaphones were used to eliminate these mistakes.

As the time for negotiating the trip through town was desired as accurate as possible, stop watches were synchronized and used.

The procedure for the conduct of the survey was as follows: A preliminary reconnaissance was made of the route and stations of observation were selected. In selecting stations, care was taken to place the stations in a safe location and away from local interference of urban traffic. Four stations of observation were used. Each observer operated a dictaphone and also the stop watch. One observer called and timed only one direction of traffic. In conducting a survey of this type an observer for each lane of traffic is necessary. The time in minutes and seconds was called when the vehicle reached the station, then the classification, state and registration number were called. In cases of obliterated numbers due to speed, passing, etc., a "miss" was called, thereby keeping an accurate volume record. The hour, minute and second were called at ten minute intervals to eliminate any errors in timing. The stations were placed 2.3 miles apart.

A trial run was made to determine delays and speed conditions on this route. Causes for delay are: two 45 degree turns, two traffic signals, one stop intersection, parking in restricted zones, parking maneuvers, one narrow railroad underpass, narrow streets, and pedestrian movement.

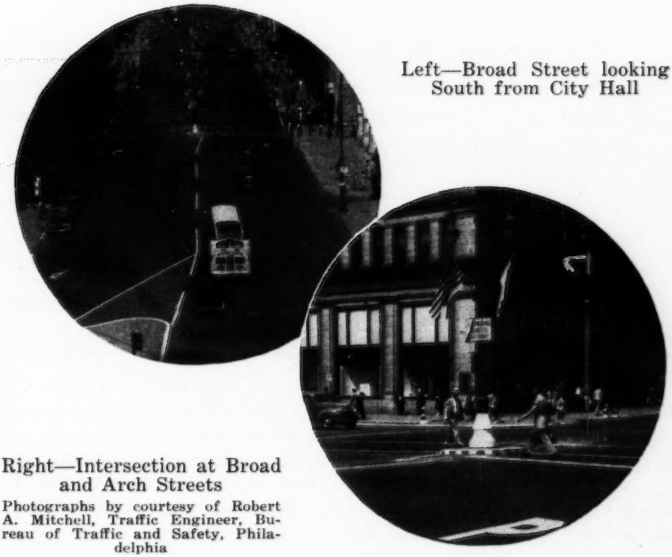
Although the survey was not extended over a period of time from which to draw conclusions, it does show the factual data which can be obtained with the minimum of personnel.

## SYNTHETIC RUBBER

A Washington dispatch on August 1 to the New York Daily News stated that Eugene Houdry, French-born chemist and physicist had entered into an agreement with the W.P.B. to produce 600,000 tons of synthetic rubber in the next 12 months.

The report continues by saying that this is twice as much as the most optimistic Government official estimated. By this method butadiene can be made in existing natural gas plants with minor construction and machinery adjustments and some of the country's big rubber manufacturers feel that the Houdry "stop gap" will ultimately prove to be the major source of production.

# PHILADELPHIA
# *SAFEGUARDS*
# Blackout and Dimout Traffic



Left—Broad Street looking South from City Hall

Right—Intersection at Broad and Arch Streets

Photographs by courtesy of Robert A. Mitchell, Traffic Engineer, Bureau of Traffic and Safety, Philadelphia

**PRISMO LIFE LINE** is being used by Philadelphia for center lines - pavement and obstruction marking - making them visible under both ordinary and reduced lighting conditions.

## Prismo Safety Corporation

**HUNTINGDON, PENNA.**

*The Famous*

**GOTHARD**
**GLO-LITE**
**TRAFFIC SIGNS**

. . . are, of course, off the market for the duration. But as soon as we have knocked Hitler and Hirohito's heads together, GOTHARD will be back with a revolutionary new improvement that you will want. Write for details when you think the time is right.

**Gothard Mfg. Company**

1300 North Ninth Street Springfield, Illinois

## PEDESTRIAN PROTECTION?

Four-fifths of the traffic fatalities in Britain's "deadliest month on record" occurred during blackouts. What are the duties of motorists and has war conditions altered the motorists' liability? A case in Birmingham, England, will illustrate the complexity of the problem. An unlighted cyclist was struck from behind by a car fitted with screened sidelights in a blackout. The case was decided in favor of the cyclist. The cyclist had his rear mudguard painted white. Curbs were painted white. The judge said "that the real cause of the accident is that under the very difficult circumstances the motorist did not see what he ought to have seen, namely, the cyclist."

The judge refused to accept the view that unless a motorist can see a red light in front of him, he is entitled to assume there is nothing in front of him. It seems that a motorist must drive in such a manner that he can stop within range of his vision.

Another case, a pedestrian walked into the side of an automobile during a blackout. The car was standing in a driveway. The motorist was waiting to emerge into the street. The judge ruled that should a person place an obstruction on the highway, he must light it or give other warning of it. Damages were awarded to the pedestrian.

Efforts in Parliament to place more responsibility on the pedestrian has failed.

December 6, 1941 issue of the English publication, "The Post Magazine and Insurance Monitor."

## We Will Win The War

Our entire facilities are now engaged in the manufacture of war materials.

We greatly miss the pleasant contacts with the many customers, officials of cities, counties, and state highway departments that we have served for so many years.

For the duration, safety departments must maintain their safety records by the use of signs already installed, or in stock, and extra care on the part of each individual motorist (and by the use of emergency signs made of plywood, that we are in a position to furnish).

Immediately after the war, we will be ready to serve you again and hope our past service may merit your renewed patronage.

**MIRO-FLEX COMPANY, Inc.**

WICHITA, KANSAS


## DO YOU KNOW

Indianapolis, Ind., plans a 60-mile belt line highway around the city to facilitate movement of troops.

The Public Roads Administration has urged state highway departments to speed studies of methods to protect vital points such as bridges and tunnels on the highway system against sabotage. Special details of Pennsylvania state motor police and Turnpike Commission guards have already been placed at the seven tunnels of the Pennsylvania Turnpike.

The Mayor's Committee on Transportation of Detroit already has 200,000 workers on staggered hours and expects soon to have 150,000 more. This program will effect a 40 per cent saving in transportation facilities. 120 firms have conducted surveys and are now organizing swap-ride clubs.

The Transportation Committee of Highland Park, N. J. plans to distribute 20,000 windshield stickers to car owners signing a pledge for group riding.

Five colleges in Providence and 275 churches throughout Rhode Island have been asked to form group riding clubs among their students, teachers and congregations.

Lack of authority and legal backing to enforce cooperation, a Rhode Island Share-the-Ride Club official declared, is needed before the statewide program will become more than 50 per cent effective.

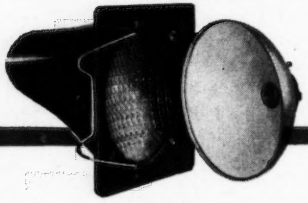
The services of the W.P.A. were offered 100 plants in the Detroit area for sorting and analyzing swap-ride questionnaires. The Detroit Traffic Engineering Bureau is sponsoring the project.

# GENERAL ELECTRIC *Announces* A NEW TRAFFIC SIGNAL

## Meets I.T.E. Specifications

BESIDES meeting present conditions that limit the use of scarce, vital materials, this new traffic signal has an improved optical unit that can be used in both adjustable-type and fixed-type signals.

For the first time a signal has been designed not only to meet the specifications of the Institute of Traffic Engineers but also to provide an outstanding benefit that is not specified by the Institute—*the elimination of "sun phantom."* This is the characteristic of a signal which makes all the lenses *appear* lighted when in the path of the sun's rays. When sun beams strike the phantom-proof reflectors of this new G-E signal, they are trapped and harmlessly directed downward by the external visor.



### *Here's a Quick Picture of the Improved Optical Unit*

1. Steel visor prevents confusion by limiting signal to only one direction.
2. Newly designed lens gives high-candlepower distribution of light. Meets recently published I.T.E. Standards.
3. Spring-wire bail prevents dust from impairing the optical efficiency of the unit by holding reflector firmly against the gasket.
4. Combined nonslip lens and reflector gasket gives dust-tight and weather-proof seal.
5. Die-cast zinc door assures accurate assembly and interchangeability.
6. New reflector provides high-candle-power beam with no danger of sun phantom.
7. Fixed-position socket provides exactly correct focus for all traffic-signal lamps.

Here are two good reasons why G-E signals stay on the job with little attention: The lamp receptacle is moulded with sealed-in leads—to leave little possibility of electrical trouble. The U-shaped gasket fits snugly over the rim of the lens to prevent slipping and leakage.

WRITE FOR BOOKLET or get the details from our nearest office. A competent G-E sales engineer will cooperate with you in the solution of any traffic-control problem. Why not get the benefit of his experience? You can, just by a letter or phone call. *General Electric, Schenectady, New York.*

*The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.*

GENERAL ELECTRIC

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